

CHOI – Application No. 10/735,912
Attorney Docket: 040021-0306769

REMARKS

Claims 1, 4, and 8 are amended hereby. Claim 3 is canceled. Accordingly, after entry of this Amendment, claims 1-2, 4, and 6-13 will remain pending. Since claims 9-13 have been withdrawn from further consideration, claims 1-2, 4, and 6-8 are currently being examined.

In the Final Office Action dated September 7, 2006, the Examiner objected to claim 4 as being improperly dependent for failing to further limit the subject matter of a previous claim. According to the Examiner, claim 4 is broader than claim 1 and, for this reason, is improperly dependent. While the Applicant disagrees, the Applicant has amended claim 4 and believes that the amendments to claim 4 overcome the rejection asserted by the Examiner. Accordingly, the Applicant respectfully requests that the Examiner withdraw the objection to claim 4.

In the Office Action, the Examiner rejected claims 1, 2, 4, 6, and 7 under 35 U.S.C. § 102(e) as being anticipated by Basceri et al. (U.S. Patent Application Publication No. 2002/0132374). Next, the Examiner rejected claims 1, 4, 6, and 7 under 35 U.S.C. § 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Ingle et al. (U.S. Patent No. 6,905,940). Claims 2, 3, and 8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Basceri et al. in view of Mitani et al. (Japanese Patent Publication No. JP 3-281780). In addition, the Examiner rejected claims 2, 3, and 8 under 35 U.S.C. § 103(a) as being unpatentable over Ingle et al. in view of Mitani et al. The Applicant respectfully disagrees with the rejections asserted by the Examiner and, therefore, respectfully traverses the same.

Claims 1-2, 4, and 6-8 are patentably distinguishable over Basceri et al. because the claims recite a chemical vapor deposition apparatus that combines a number of features including, among them, a gas supply assembly that is divided into a first section that occupies a center portion and a second section that occupies an outer portion and a controller that increases the distance between a wafer and the gas supply assembly as a time required to form the deposition layer elapses. Basceri et al. does not describe at least these features and, therefore cannot be relied upon to anticipate claims 1-2, 4, and 6-8. Accordingly, the Applicant respectfully requests that the Examiner withdraw the rejection under 35 U.S.C. § 102(e).

Basceri et al. describes a method for controlling deposition of dielectric films. In connection with Fig. 3, Basceri et al. describes a CVD system 50 with a barium-containing organometallic precursor source 52, a strontium-containing organometallic precursor source 53,

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and a titanium-containing organometallic precursor source 54, which are controlled by flow controllers 62-64 to feed the vaporizer 56. (Basceri et al. at paragraph [0043].) The distance D between the delivery device 72 and the substrate assembly 10 may be varied. (Basceri et al. at paragraph [0053].) Either one of the delivery device 72 or the substrate assembly 10 may be moved to adjust the distance D. (Basceri et al. at paragraph [0054].) As the spacing decreases, atomic percent of titanium in the film 12 decreases where the atomic percent of barium increases. (Basceri et al. at paragraph [0053].)

There is no discussion in Basceri et al. of a gas supply assembly that is divided into a first section that occupies a center portion and a second section that occupies an outer portion. To the contrary, Basceri et al. described only one delivery device 72. In addition, while Basceri et al. does describe that the distance D may be varied, there is no discussion that the distance D between the substrate assembly 10 and the delivery device 72 is increased as a time required to form the deposition layer elapses. The Applicant proposes that the distance D may be varied before a deposition process begins. There is nothing to suggest that the distance D is varied as a time required to form the deposition layer elapses. At least for these reasons, the Applicant respectfully submits that Basceri et al. does not describe each and every feature recited by claims 1-2, 4, and 6-8. Accordingly, the Applicant respectfully submits that Basceri et al. cannot be relied upon to anticipate any of the claims currently being examined. As a result, the Applicant respectfully requests that the Examiner withdraw the rejection under 35 U.S.C. § 102(e).

Ingle et al. also cannot be relied upon to anticipate any of claims 1-2, 4, and 6-8. Ingle et al. describes a method using TEOS ramp-up during TEOS/Ozone CVD for improved gap-fill. Specifically, with reference to Fig. 1A, illustrates a CVD system 10 that includes a gas delivery system 89, a vacuum system 88, and a control system 53. (Ingle et al. at col. 4, lines 19-25.) The CVD system 10 includes a gas distribution plate 20 and a heater 25 on which a wafer is placed. (Ingle et al. at col. 4, lines 26-33.) The heater 25 may be moved between a lower position and an upper position. (Ingle et al. at col. 4, lines 33-38.) The height of the heater 25 may be varied during processing to affect the rate of deposition. (Ingle et al. at col. 8, lines 45-54.)

While Ingle et al. describes that the heater 25 may be moved during processing, there is no discussion of a chemical vapor deposition apparatus that combines a number of features including, among them, a gas supply assembly that is divided into a first section that occupies a

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center portion and a second section that occupies an outer portion. Accordingly, Ingle et al. does not describe each and every feature recited by claims 1-2, 4, and 6-8. As a result, the reference cannot be relied upon to anticipate any of the claims. Therefore, the Applicant respectfully requests that the Examiner withdraw the rejection under 35 U.S.C. § 102(e) with respect to this reference.

With respect to the rejection of claims 1, 4, 6, and 7 under 35 U.S.C. § 103(a) as being obvious over Ingle et al., the Applicant respectfully submits that the mere discussion of a gas distribution plate 20, without any suggestion to divide the plate 20 into central and outer portions, cannot be said to render obvious the arrangement recited by claims 1-2, 4, and 6-8. Simply, there is nothing upon which the Examiner may rely to reach this conclusion. Accordingly, the Applicant respectfully submits that the Examiner has not made out a *prima facie* case of obviousness. At least for this reason, therefore, the Applicant respectfully requests that the Examiner withdraw the rejection.

Turning to the rejection of claims 2, 3, and 8 as being unpatentable over the combination of Basceri et al. and Mitani et al., the Applicant first redirects the Examiner's attention to the discussion of Basceri et al. above. As noted there are at least two features absent from the disclosure in Basceri et al. Mitani et al. does not correct the deficiencies noted with respect to Basceri et al. Accordingly, the Applicant respectfully submits that the two references cannot be combined to render obvious claims 1-2, 4, and 6-8.

Mitani et al. describes a CVD device that includes a gas feeding system, a reactor, and a gas exhaust system. The gas feeding system consists of a gas cylinder 11, multiple gas piping groups 12 (three in the illustrated example), and flow control device groups. (Mitani et al. at translation page 4, lines 20-26.) There is no discussion or suggestion, however, of any controller that increases the distance between a wafer and the gas supply assembly as a time required to form the deposition layer elapses. Without such a suggestion, the Applicant respectfully submits that the two references cannot be combined in the manner suggested by the Examiner. Accordingly, the Applicant respectfully submits that the rejection must be withdrawn.

Ingle et al. suffers from similar deficiencies. Accordingly, the Applicant respectfully requests that the rejection combining Ingle et al. and Mitani et al. be withdrawn.

With respect to these rejections, the Applicant further points out that none of the references describe or suggest a combination of features including, among them, a process gas

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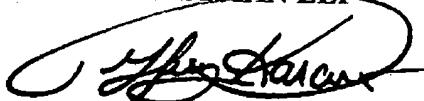
line connected to each of the first and second sections, and a control valve, opened and closed by the controller, that is mounted on the process gas line of the second section. Since none of the references describe such a feature in combination with those discussed above, the Applicant respectfully submits that the claims are further distinguishable from the references for this additional reason.

Each of the objections and rejections having been addressed, the Applicant respectfully submits that this application has been placed into a condition for allowance. Accordingly, the Applicant respectfully requests that a speedy issuance of a Notice of Allowance for claims 1-2, 4 and 6-8.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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